

WHAT IS CLAIMED IS:

- 1 1. A steerable mirror assembly comprising:
2 a mounting plate;
3 a mirror with a mounting surface and a reflective surface;
4 at least one flexible connector coupled between the mounting plate and a
5 peripheral portion of the mirror wherein the at least one flexible connector is adapted to allow
6 the mirror to move within a predetermined range along an axis perpendicular to the surface of
7 the mirror and adapted to allow tilting around axes parallel to a plane of the mirror;
8 at least one moveable support member coupled between the mounting plate
9 and the mounting surface of the mirror wherein the at least one moveable support member
10 provides mechanical support to the mirror and is adapted to move the mirror within a
11 predetermined range along an axis perpendicular to the surface of the mirror and adapted to
12 allow tilting around axes parallel to a plane of the mirror; and
13 at least one position sensor.
- 1 2. The steerable mirror assembly of claim 1 further comprising a mirror
2 support structure, wherein the mirror is mounted on the mirror support structure.
- 1 3. The steerable mirror assembly of claim 1 further comprising at least
2 one reaction mass mounted below a second surface of the mounting plate.
- 1 4. The steerable mirror assembly of claim 3 wherein the at least one
2 reaction mass comprises:
3 at least one flexure, and
4 at least one position sensor.
- 1 5. The steerable mirror assembly of claim 1 wherein the at least one
2 flexible connector is a C-flexure.
- 1 6. The steerable mirror assembly of claim 1 wherein the at least one
2 flexible connector is a U-flexure.
- 1 7. The steerable mirror assembly of claim 5 wherein the C-flexure is
2 selected from the group of metal and plastic.

1 8. The steerable mirror assembly of claim 6 wherein the U-flexure is a
2 composite multi-layer metal structure.

1 9. The steerable mirror assembly of claim 1 wherein the mirror has a
2 central aperture.

1 10. The steerable mirror assembly of claim 1 wherein the at least one
2 flexure comprises three flexures providing control over three degree of freedom.

1 11. A steerable mirror assembly comprising:
2 a mounting plate;
3 a mirror support structure;
4 a mirror mounted in the mirror support structure;
5 at least one flexible member coupled between the mounting plate and a
6 peripheral portion of the mirror support structure;
7 at least one controllably moveable support member mounted between the
8 mounting plate and the mirror support structure and located at a radial location between the
9 outer edge of the mirror support structure and a centerpoint of the mirror; and
10 at least one position sensor.

1 12. A steerable mirror comprising:
2 a mirror;
3 a mirror support structure configured to receive the mirror;
4 a mounting plate;
5 a plurality of flexible members connecting the mirror support structure to the
6 mounting plate;
7 a plurality of actuators connecting the mirror support structure to the mounting
8 plate; and
9 a plurality of position sensors configured to monitor a position of the mirror
10 support structure.

1 13. A method of operating a steerable mirror comprising:
2 measuring position data from at least one position sensor;
3 transforming the position data from a sensor coordinate space to a Cartesian
4 coordinate space to create control data;

5 generating tilt and piston commands;
6 calculating tilt and piston control laws using the tilt and piston commands and
7 the control data;
8 transforming the control laws from a Cartesian coordinate space to an actuator
9 space to create actuator data; and
10 generating signals to actuate moveable members.

1 14. The method of claim 13 further comprising:
2 performing calculations to modify the position data after the step of measuring
3 position data; and
4 performing calculations to modify the actuator data after the step of
5 transforming the control laws from a Cartesian coordinate space to an actuator space.

1 15. The method of claim 13 wherein the step of generating signals
2 comprises generating a plurality of simultaneous signals.